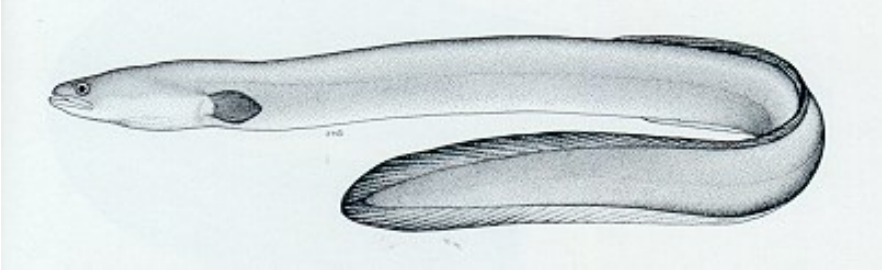
Southern Shortfin Eel (*Anguilla australis*)



Stock Structure and Biology

Southern Shortfin Eel is widespread in coastal streams of south-eastern Australia, from the Pine River in southern Queensland to the Murray River in South Australia, and Tasmania, and also occurs in New Zealand and western Pacific Islands (Beumer 1996). In Victoria, the species occurs in all coastal river catchments (Cadwallader and Backhouse 1983) and has been stocked into several inland lakes for aquaculture (REF). Genetic studies indicate that Southern Shortfin Eel represents two geographically separate subspecies; *A. australis australis* in Australia and *A. australis schmidtii* in New Zealand and western Pacific islands (Shen and Tzeng 2007). Three other eel species occur in Australia, *A. reinhardtii* (Longfin Eel) (*see chapter*), *A. obscura* and *A. bicolor*, the latter two being tropical species with limited distribution in Australia and with limited commercial harvest (Jellyman 2016). Shortfin eels reach a size of up to 1.1 m and 3.2 kg for females, and 0.5m and 0.25 kg for males (Beumer 1996). Shortfin eels, as with other *Anguilla* species, are catadromous, spending much of their life cycle in estuaries or fresh water, before returning to the ocean to reproduce and die. At time of migrating shortfin eels may be 10-30 years old. Australian eel species are thought to spawn in the Coral Sea region of the West Pacific Ocean. Based on collection of larvae, their ages and oceanic currents, Kuroki et al. (2020) suggested that shortfin eels spawn in June and July at locations between the Solomon Islands and Fiji. Following hatching, larvae (leptocephali) are transported toward the eastern Australian coastline by the South Equatorial Current, and then along the coast by the East Australian Current. Larvae metamorphose to glass eels, which actively swim toward and into the embayments and estuaries of the eastern Australian continent. Based on its life history and migration patterns, the shortfin eel is thought to constitute single biological stock across its range.

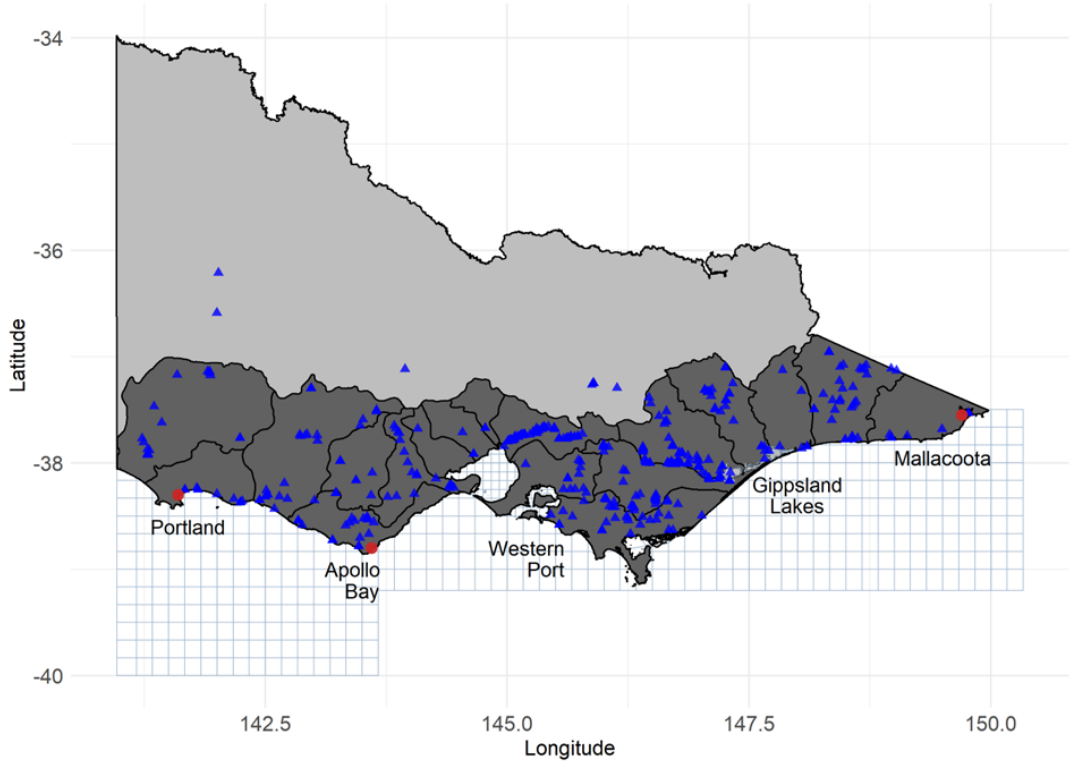


Figure 135 Southern Shortfin Eel distribution in Victoria (Dark shaded area = coastal river basins. Blue triangle = catch records from fisheries surveys).

Assessment Summary

The Victorian Eel Fishery is comprised of both Longfin Eel and Southern Shortfin Eel, which have different but overlapping distributions in estuarine and freshwaters east and south of the Great Dividing Range. Commercial fishing is generally confined to lower and estuarine reaches of waters that are open to fishing and predominantly targets migrating eels. The Victorian Southern Shortfin Eel Fishery, which is managed as one stock, supports both recreational and commercial fisheries.

The status of Southern Shortfin Eel was evaluated using:

- Available harvest information for the commercial eel fishery
- Nominal catch per unit effort (CPUE) for the commercial eel fishery fishing with fyke-nets.

This assessment found:

- *Fishing pressure* – The Victorian Southern Shortfin Eel Fishery is managed using a range of input controls and at least thirty per cent of all connected rivers, creeks and streams with a common opening to the sea are closed to commercial fishing (Victorian Fisheries Authority 2017). Since 1979/80 annual catch has been highly variable (Figure 136). Throughout the 1980s and 1990s annual catch ranged from 131–310 t, but thereafter declined considerably to an historic low of 32 t in 2010/11. This decline is attributed to the Millennium Drought (2000–2011), which ended following emergence of La Niña weather conditions. Since then annual catch has continued to vary, averaging 58 t per year with a low of 36 t in 2016/17 and a high the following year of 84 t (Figure 136).

  There is no long-term estimate of recreational harvest, but it is believed to be very low. In recent surveys of recreational fishing licence holders, <0.4 per cent of anglers fishing in rivers and lakes preferred to catch eels and just 2.6 per cent indicated their favourite fish in inland waters to catch was eel (Australian Survey Research 2012, 2018).

  Eel is an important resource for some Aboriginal communities. The use of fish traps, channels and aquaculture systems (ponds and dam walls) in western Victoria dates back tens of thousands of years (Head 1989, Richards 2011). However, no quantitative estimates of the Aboriginal harvest of eels from Victorian waters are available.

- *Biomass* – Annual CPUE during normal fyke net fishing operations (excluding large scale removals of many tonnes of stocked eels with seine nets ahead of impending drought), has ranged from 0.4 to 66 kg/net-day with an overall average of 18.7 kg/net-day since 1979/80 (Figure 137). Annual CPU declined following the Millennium Drought and since 2011/12 has been then has been low but relatively stable, ranging from 0.4 to 17.6 kg/net-day.

  Juvenile and undersized eels (elvers and “snigs”), known as “restock”, are netted from coastal rivers and relocated to designated culture lakes (confined lakes and impoundments) in inland western Victoria for on-growing to market size under an Aquaculture Licence. This practice, which commenced in the 1960s, is dependent on access to restock eels. Productivity from culture lakes is highly susceptible to short and long term and seasonal environmental variations, particularly drought (Victorian Fisheries Authority 2017). Since 2003 restock Southern Shortfin Eels have represented on average 14 per cent (2.8–48 per cent) of the total annual catch.

Stock status summary: The eel fishery is subject to strong environmental drivers that can severely reduce productivity. Nonetheless, the above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Furthermore, the above evidence also indicates that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired. On the basis of the evidence provided above, Southern Shortfin Eel in Victoria is classified as a sustainable stock.

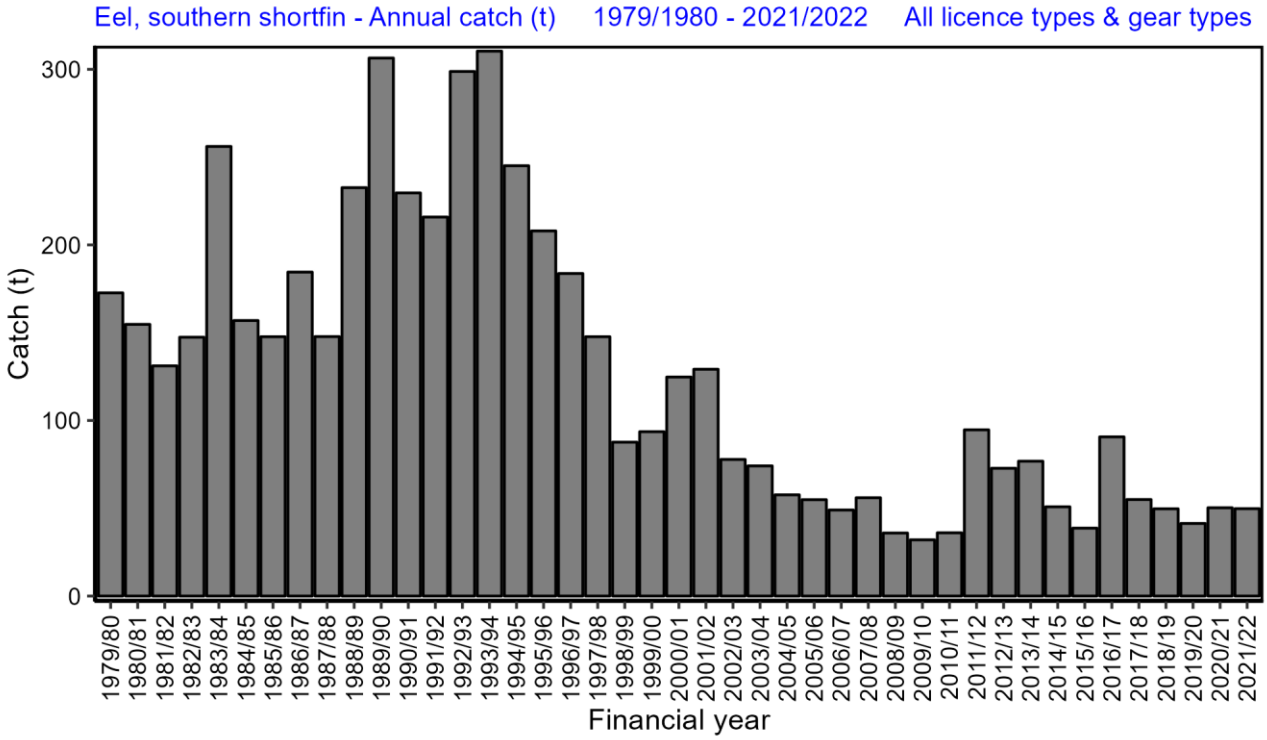


Figure 136 Southern Shortfin Eel harvest by Victorian licenced commercial operators during financial years 1979/79–2021/22.

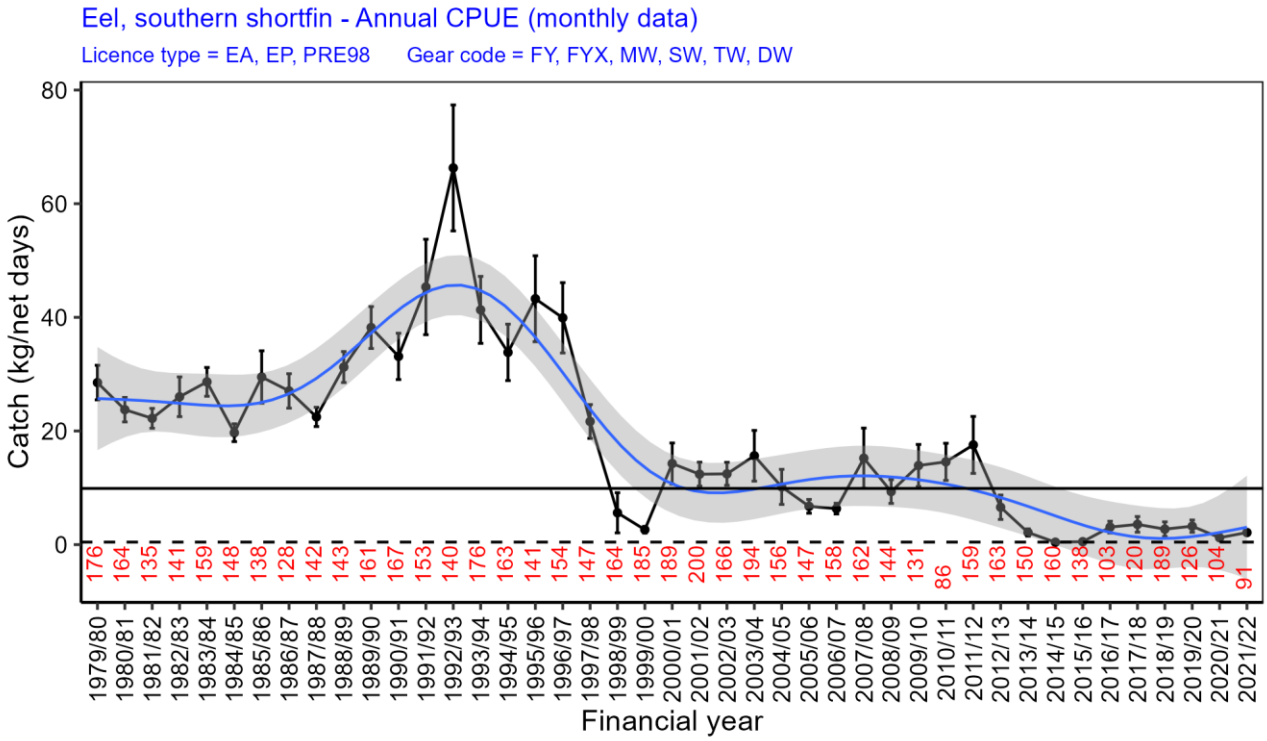


Figure 137 Nominal catch-per-unit-effort (CPUE) for commercial fyke net catches of Southern Shortfin Eels during 1979/80 – 2020/21.